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PROVISIONAL INTELLIGENCE REPORT

54/PC

PLANT STUDY OF THE IRON AND STEEL INDUSTRY  
OF THE USSR: ECONOMIC REGION VI, VOLGA

CIA/RR PR-58

(ORR Project 23.177)

20 April 1954

DOCUMENT NO.	
NO CHANGE IN CLASS. <input type="checkbox"/>	
DECLASSIFIED <input type="checkbox"/>	
CLASS. CHANGED TO: TS S C	01989
NEXT REVIEW DATE:	
AUTH: HR 70-2	
DATE: 4-10-71	REVIEWER: 372044

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FOREWORD

This report covers those plants in Economic Region VI which produce metallurgical coke, pig iron, and steel ingots, as well as steel castings and other types of finished steel.

The primary intelligence value of this report lies in the basic evaluation of plant capacity of this region as a contribution to the capabilities of the USSR in the production of metallurgical coke, pig iron, steel, and finished steel products. The localization of industrial centers and individual plants and their importance in the Soviet iron and steel industry furnish valuable target information. Regional production estimates of the Soviet iron and steel industry also will serve as a check on Soviet statistics. Although Economic Region VI, Volga, accounts for only 4.2 percent of the steel production of the USSR and 3.9 percent of the finished steel, it contains two important installations -- the Stalingrad Metallurgical Plant, that produces quality carbon and alloy steels, and the Ammunition and Ordnance Plant Krasnaya Barrikada 221. Together, these plants turn out over a million tons of finished steel products.

This report is one of a series of regional provisional reports that will provide basic research data for a comprehensive study which is to be made on the iron and steel industry of the USSR.

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(ORR Project 23.177)

PLANT STUDY OF THE IRON AND STEEL INDUSTRY OF THE USSR:  
ECONOMIC REGION VI, VOLGA\*

Summary

Although the growth of manufacturing establishments has been emphasized in this area, particularly since World War II, Economic Region VI\*\* has not developed into a major steel producing area. One of the retarding factors has been that the Volga Region does not possess a good raw material base. A paucity of iron ore deposits leaves this area with no local source of this prime raw material. The only significant deposit is at Khoperakaya on the Khoper River, but, because of their unusual composition and inaccessibility, iron ores from this field have not been exploited. Furthermore, Region VI contains no deposits of coking coal. Presumably for these reasons, the Russians have not established any pig iron or coking facilities in this region.

Steel production in Region VI is obtained principally from the Stalingrad Metallurgical Plant, which accounts for approximately 75 percent of the output. All other steel facilities are located in captive foundries.

In 1953, Region VI produced 1.584 million metric tons\*\*\* of steel for ingots and castings and 1.082 million tons of finished steel. Of the total steel and finished steel production of the USSR in 1953, Region VI accounted for 4.2 percent and 3.9 percent, respectively. Steel castings amounted to 213,000 tons, or 19.7 percent of the finished steel production. Iron and steel production in Region VI during 1953 are given in Table 1.\*\*\*

The future growth of the steel industry in Region VI will be dependent largely upon the demand generated by the expansion of manufacturing enterprises in this area or by the development of suitable sources of raw material.

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\* The estimates and conclusions contained in this report represent the best judgment of the responsible analyst as of 30 March 1953.

\*\* The term region as used in this report refers to the economic regions defined and numbered on CIA Map 12048.1, 9-51 (First Revision, 7-52), USSR: Economic Regions.

\*\*\* Tonnages are given in metric tons throughout this report.

\*\*\*\* Table 1 follows on p. 2.

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Table 1

Iron and Steel Production in Region VI of the USSR  
1953

Plant	Thousand Metric Tons		
	Pig Iron	Steel	Finished Steel
Ammunition and Ordnance Plant Krasnaya Barrikada 221	0	255.0	140.0
Saratov Munitions and Metal Products Plant 614	0	40.0	24.0
Saratov Tractor Parts Plant Serp I Molot	0	10.0	6.0
Stalingrad Metallurgical Plant	0	1,207.0	869.2
Zelenodolsk Ammunition and Agricultural Machinery Plant	0	30.0	18.0
Zelenodolsk Shipyard 340	0	41.7	25.0
Total	0	<u>1,583.9</u>	<u>1,082.2</u>

1. Ammunition and Ordnance Plant Krasnaya Barrikada 221 (Red Barricade Ordnance Plant) (IR No. 7012828).a. Location.

48°45' N - 44°25' E, Stalingrad, Stalingrad Oblast. The plant is located along the Volga River, 6 kilometers (km) south of the Dzerzhinskiy Tractor Plant, and 1 km south of the Stalingrad Metallurgical Plant. 1/8.

b. History and Development.

The Red Barricade Ordnance Plant, reputed to be one of the largest gun manufacturing plants in the USSR 2/, was reported to have been started just before World War I. There are indications, however, that this plant may have begun as early as 1880, when the French concern Creusot, also armament producers, built the Stalingrad Metallurgical plant.

\* Footnote references in arabic numerals are to sources listed in Appendix D.



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The Red Barricade Ordnance Plant is essentially a machine-building and ordnance plant, with extensive machining and assembly facilities. The plant was expanded, and in 1941 there were eight 50-ton open-hearth and 2 electric furnaces, 4 rolling mills, a pressing and forging shop, and a heat treatment department. 3/

During the battle of Stalingrad, the ordnance plant was almost completely destroyed. Reconstruction began in 1943 and was approximately 70 percent completed in 1949. 4/ Although rehabilitation was not complete in April 1950, the plant had resumed production in mid-1946. 5/

c. Raw Materials and Other Inputs.

In 1949, weekly inputs to steel production were scrap, 300 tons; pig iron, 600 tons; lime, 40 tons; coal, 100 tons; and coke, 100 tons. 6/ Nickel and chrome were other inputs, the quantities and sources are not known. Semifinished steel in the form of ingots, slabs, blooms, and billets are supplied by the Stalingrad Metallurgical Plant. 7/ Fuel oil is supplied by barge from Baku. 8/

d. Coking Facilities.

None.

e. Ironmaking Facilities.

There are no blast furnaces for the production of pig iron. The iron foundry has 3 cupolas, approximately 72 inches in diameter for making cast iron. 9/ Estimated cast iron production from the 3 cupolas is 120,000 tons annually.

f. Steelmaking Facilities.

Although there were eight 50-ton open-hearth and 2 electric furnaces before destruction 10/, the present facilities are estimated to have six 50-ton open-hearth furnaces, each producing 2 heats per day. 11/ All open-hearth furnaces are oil fired and charge cold metal. 12/ In addition to the open-hearth shop, there are two 30-ton electric furnaces. 13/ Steel production at the Ammunition and Ordnance Plant Krasnaya Barrikada 221 for 1952 and 1953 is given in Table 2.\*

g. Primary Rolling Mills.

There are no blooming bar or billet mills at the Red Barricade Ordnance Plant. Ingots, billets and bars for forgings, and slabs for plates are furnished by the nearby Stalingrad Metallurgical Plant. 14/

\* Table 2 follows on p. 4.

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Table 2

Steel Production at the Ammunition and Ordnance Plant Krasnaya Barrikada 221  
1952 and 1953 a/

<u>Furnaces</u>		<u>Individual Capacity (Metric Tons)</u>	<u>Coefficient</u>	<u>Heats per Day</u>	<u>Operating Days per Year</u>	<u>Production (Thousand Metric Tons)</u>
<u>Number</u>	<u>Type</u>					
6	Open-Hearth	50	N.A.	2	325	195.0
2	Electric	30	N.A.	3	325	60.0
						<u>255.0</u>

a. Since there are no reports of increased efficiency of operations or expansion of facilities in 1953, steel production is estimated to have been the same in 1952 and 1953.

h. Finishing Facilities.

Rolling Mill: The flat rolling mill, which produces nickel-type armorplate of 2.5 x 8 x 0.1 meters (m), is a 2-high mill, with roll diameters of 30 centimeters (cm). 15/ Annual capacity is unknown.

Forging and Pressing Shop: To provide forgings and stampings for machine building, there are four 600-ton presses and 10 steam hammers, including what was reported in 1949 to be the largest hammer in the world. 16/

Steel Foundry: The steel foundry is supplied with plain carbon and alloy heats by the open-hearth furnace shops. 17/ Since most of the semi-finished steel is furnished from other sources, it is assumed that most of the steel production goes into castings. On this basis, using a yield of 55 percent, it is estimated that 140,000 tons of finished steel castings are produced annually.

Iron Foundry: The iron foundry with its 3 cupolas and auxiliary shops for patternmaking, coremaking, and cleaning produces approximately 75,000 tons of finished iron castings annually. 18/

Heat Treatment Shop: The heat treatment shops has eight oil-fired furnaces for treatment of castings and forgings. There are also large oil-quenching tanks for the quenching of gun barrels. 19/

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1. Intraplant Services.

Electric Power: Before World War II this plant had a power plant of 50,000-kilowatt (kw) capacity 20/, but this plant was destroyed during the war. There are no indications that this power plant has been rebuilt, and the total generating capacity at the present time is supplied from three 400-kw generators. 21/ In addition, there is a transformer station which reduces a line voltage of 6,300 to 380 volts (v) for machinery operation and to 220 v for the lighting system. 22/

Water Supply: Water for the steel works comes from the Volga River, but it is not clear whether this plant has its own pumping station or shares in the water distribution system of the Stalingrad Metallurgical Plant. 23/

Maintenance Department: A machine shop with the usual complement of equipment exists for the maintenance of the iron and steel foundries. 23/

J. Products and Production.

End military equipment presently being produced are 152-millimeter (mm) heavy guns and 203-mm and 280-mm howitzers. 24/ Finished goods for the civilian economy include machinery for the oil industry and excavators. 25/

Products from the iron and steel foundries, rolling mill, and forging and pressing shop are carbon and alloy (chrome, chrome-nickel) castings, forgings, and armorplate. Castings and forgings are made for turrets, bogies, idlers, sprockets, gears, links and shoes for caterpillars, wheels, crankshafts, and many automobile parts. 26/ In 1953 the Red Barricade Ordnance Plant produced 255,000 tons of steel, 140,000 tons of steel castings, 75,000 tons of iron castings, and an unknown amount of rolled steel.

K. Distribution of Products.

Practically all of the steel produced is consumed in the form of castings, forgings, or plate in the manufacturing of machinery at the Red Barricade Ordnance Plant. There is evidence of an occasional shipment of castings or forgings to the nearby Dzerzhinskiy Tractor Plant. 27/

L. Plant Efficiency.

No information available.

M. Administration.

No information available.

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n. Personnel.

In 1949 the director of the plant was Volkenschein (fna), a Russian Jew over 50 years old, and the chief engineer was I.N. Samsonov, 56 years old. 28/

The number of employees engaged in iron and steel foundries and associated mills could not be established, but the entire plant, including the fabricating facilities, employs 8,000 workers. 29/

In December 1949, average wages of common labor were 400 to 600 rubles per month, while the wages of skilled labor like electric welders were 1,500 rubles per month. 30/

2. Saratov Munitions and Metal Products Plant 614 (Saratov Metal Products Plant, Traktordetail Parts Plant 52, and Universal Machine Factory) (IR No. 7002743).

a. Location.

51°32' N - 46°00' E, Saratov, Saratov Oblast. The plant is located about 2 km southeast of the center of the city of Saratov, just northwest of the Saratov Tractor Parts Plant Serp I Molot. 31/

b. History and Development.

The plant was constructed about 1918 and was improved and enlarged in 1932. 32/ Some additional facilities were installed in 1947 and 1948. 33/

Most of the activity of this plant is concerned with machine building, specializing in the fabrication of guns and tank parts.

c. Raw Materials and Other Inputs.

In 1949 this plant received 120 tons of pig iron daily 34/ and 120 tons of coke weekly. 35/ The sources of pig iron and coke could not be determined. Scrap was obtained locally.

d. Coking Facilities.

None.

e. Ironmaking Facilities.

There are no blast furnaces for the production of pig iron, but the iron foundry contains 2 cupolas, approximately 1 m in diameter, each with a

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capacity of 3 tons per hour, for making gray iron castings. 36/ One capital operated each day while the other was being repaired on a casting schedule of every 3 hours throughout 2 shifts per day for 6 days per week. 37/ On this basis, it is estimated that 22,000 to 23,000 tons of gray iron are produced annually.

f. Steelmaking Facilities.

A number of sources claimed that there are four small open-hearth furnaces at this plant. 38/ Because there were no indications of the capacities, hearth areas, number of heats per day, size of steel castings from a heat, or size of heats, steel production for 1953 is roughly estimated at 40,000 tons.

g. Primary Rolling Mills.

None.

h. Finishing Facilities.

In addition to the iron and steel foundries with their complements of patternmaking, coremaking, and cleaning shops, there is a heat treatment shop which has seven annealing furnaces, some of which were constructed in 1948 and 1949. There are also two pit-type hardening furnaces, each with an oil-quenching tank used for heat treating gun barrels. 39/

i. Intraplant Services.

All the power, gas, and water consumed by this plant are furnished by the city services of Saratov. 40/

j. Products and Production.

From 14,500 tons of gray iron castings and 24,000 tons of steel castings, the following finished items are produced 41/:

Naval AA guns: 3.7 cm caliber, 24 to 26 guns per month.

Gun barrels for other guns: 100 barrels per month.

Spare parts for tanks, such as gears, bearings, and connecting rods.

k. Distribution of Products.

All iron and steel castings are finished within the plant. Finished gun barrels are shipped to Murmansk, Omsk, Sevastopol, Moscow, and the

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Odessa. Spare parts for tanks are shipped to Odessa, Krasnograd, Murmansk, Moscow, Leningrad, and Stalingrad. 42/

l. Plant Efficiency.

After a poor showing in 1946 this plant was among the 12 industrial enterprises in Saratov which fulfilled the production program for 1947. 43/ Recently, rejected castings amounted to 3 percent. 44/

m. Administration.

Before the reorganization of the ministries, this plant was under the Administration of Munitions Industry. The telegraphic address is Saratov Universal. 45/

n. Personnel.

In 1949 there were 3,000 people employed in the entire plant. Approximately 70 percent of the workers were women. 46/ The average wage paid to unskilled labor was 420 rubles per month in 1947. 47/

o. Saratov Tractor Parts Plant Serp i Molot (formerly Kaganovich Iron Works) (IR No. 7028225).

a. Location.

51°32' N - 46°01' E, Saratov, Saratov Oblast. 48/ The Saratov Tractor Parts Plant is situated roughly in the center of Saratov, approximately 2 km north of the Volga River and near the north end of the Saratov Railroad Yards.

b. History and Development.

The Kaganovich Iron Works, which later became a part of the Saratov Tractor Parts Plant, was built before 1917 and was formerly the property of a German industrialist, Bernstein. 49/ The plant suffered no war damage but was considerably modernized with US machinery beginning in 1948. Renovation was completed in the spring of 1950. 50/

c. Raw Materials and Other Inputs.

Raw material inputs to the iron and steel foundries include 360 tons of pig iron and 900 tons of iron and steel scrap per week and 180 tons of coke and 480 tons of molding sand per month. 51/ Pig iron is shipped in by rail, 52/ while iron and steel scrap is obtained locally. Molding sand comes from the Stalingrad area. 53/

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d. Coking Facilities.

None.

e. Ironmaking Facilities.

Although this plant produces no pig iron, the iron foundry has 2 cupolas of approximately 72 inches in diameter for the production of gray cast iron. <sup>54/</sup> Based on the average capacity of a cupola of this diameter and the fact that these cupolas alternated on production every other day <sup>55/</sup> and were tapped 8 times daily, <sup>56/</sup> it is estimated that gray iron production amounts to 40,000 to 55,000 tons annually.

f. Steelmaking Facilities.

There is one 2-ton electric furnace <sup>57/</sup> and possibly 1 or 2 other small electric furnaces, which could not be confirmed. The 1953 production reportedly was 10,000 tons. <sup>58/</sup>

g. Primary Rolling Mills.

None.

h. Finishing Facilities.

The only finishing facilities directly associated with the ironmaking and steelmaking facilities are the iron and steel foundries and the heat treatment shop for castings.

(1) Heat Treatment Shop.

This shop contains 5 older gas-fired furnaces for annealing <sup>59/</sup> and 3 new German-made electric furnaces for hardening of parts. <sup>60/</sup>

i. Intraplant Services.

The plant at Saratov receives its electric power from the city power plant, gas comes from the communal gas works, and water is supplied from the city water system. <sup>61/</sup>

j. Products and Production.

From 25,000 to 35,000 tons of gray iron and 6,000 tons of steel castings, cylinder blocks and clutches for tractors, gears, crankshafts

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camshafts, skirts, valve guide bushings, pulleys, and other small parts of tractors are produced. 62/

k. Distribution of Products.

All gray iron and steel castings are used by the plant for the production of tractor parts. Most of the finished parts are shipped to the Dzerzhinskiy Tractor Plant at Stalingrad. 63/

l. Plant Efficiency.

In 1950, measures were taken to increase the productivity of labor and to improve the coefficient of utilization of equipment. These steps, along with the installation of some new equipment, resulted in a 23-percent increase in the productivity of labor. 64/

m. Administration.

No information available.

n. Personnel.

It was not possible to determine the number of employees in the ironmaking and steelmaking sections only, but the entire plant employs 1,500 to 2,000 people, of whom 50 percent are women. Wages paid in 1950, on a monthly basis were 450 rubles for unskilled labor, 800 rubles for skilled workers, and 1,200 rubles for engineers and technicians. 65/

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o. Locational Characteristics.

4. Stalingrad Metallurgical Plant (Red October Plant) (IR No. 7007157).

a. Location.

48°45' N - 44°34' E, Stalingrad, Stalingrad Oblast. 66/

The Stalingrad Metallurgical Plant is located about 10 km northeast of the center of the city of Stalingrad 67/ and 500 m west of the Volga River. 68/ The Dzerzhinskiy Tractor Plant is located 6 km north of the plant, and the Red Barricade Ordnance Plant is located 1 km north of the plant. 69/

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S-E-C-R-E-Tb. History and Development.

The plant, originally called Dumeau, was built by the French in 1880, 70/ with further construction following in 1897. At this time the open-hearth shop consisted of two 5-ton, two 20-ton, and five 30-ton furnaces. Annual ingot capacity is estimated to have been 130,000 tons. 71/

In 1929, German and French engineers were engaged to further re-construct the plant. 72/ By 1932 a new open-hearth shop with seven furnaces was equipped with the most modern German-designed machinery. Capacities and dates of installation of the seven furnaces are as follows:

<u>Furnace Number</u>	<u>Hearth Area (Square Meters)</u>	<u>Date Placed in Operation</u>
8	39.03	19 May 1929
9	39.03	13 June 1929
7	39.03	27 April 1930
10	39.03	7 July 1930
11	39.31	24 November 1931
12	39.31	28 February 1932
13	39.31	20 September 1932

The modernization was followed by poor management, disorganization and high labor turnover with the result that only 50 percent of the planned production was realized in the first 9 months. Radical changes took place on the arrival of Voroshilov and Pyatakov in September 1932. The plant was placed under the management of "Special Steel," production of merchant steel stopped, fundamental technical changes took place, and quality control was put on a scientific basis. In 1933 the production quota for quality steel was fulfilled by 112.3 percent, an increase of 40 percent over 1932. 73/

The Stalingrad Metallurgical Plant, consisting of 15 steel furnaces, was approximately 90 percent destroyed during the battle of Stalingrad in 1942 and 1943. After seizure from the Germans, the first open-hearth furnace was restored in June 1943. In August a 450-mm medium-quality mill was put into operation, and in October a sheet mill was started. In 1944, steel smelting tripled, and rolled steel increased fourfold. 74/

Following the destruction during World War II, it was necessary to rebuild the water main from the Volga River to the plant area, a distance of 1 km; the pumping station; the electric power plant; and the railroad and highway networks serving the plant.

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In 1944, steam boilers, open-hearth furnaces, blooming mills, sheet and other rolling mills, soaking pits, foundry, and machine shop were constructed. 75/

In 1945, 1 open-hearth furnace 76/ and 3 units for pressing and forging were added. During 1946, 6 more open-hearth furnaces 77/ and 44 additional units for forging and pressing were put into operation. 78/

By October 1947, 12 open-hearth furnaces, 9 rolling mills, and 120 cranes had been restored since the end of World War II. The thirteenth open-hearth furnace began operating late in 1947. At this point, pre-World War II production was attained. 79/ All war damage had been restored by July 1949. 80/

c. Raw Materials and Other Inputs.

The principal raw materials, in order of their quantitative importance, are iron and steel scrap, pig iron, iron ore, ferroalloys including nickel, and chrome, limestone, and manganese. 81/

In 1949 it was reported that there were daily arrivals of 3 trainloads of 20 cars each (50 tons per car) of steel scrap and 3 trainloads of 10 cars each (20 tons per car) of pig iron, or approximately 3,000 tons of steel scrap and 600 tons of pig iron daily. 82/ Because the stockpiles did not increase, 83/ it is assumed that this was the daily consumption.

The supply of iron and steel scrap up to the spring of 1948 was largely from war damage and came principally from Germany. 84/ By 1949, scrap was in short supply. 85/ Pig iron was received in 40 to 60 kg pigs 86/ in cars labeled from Saratov, a junction point. 87/ The original source of the pig iron is not known. Some iron ore used in small quantities as feed ore for the open-hearth furnaces comes from Krivoy Rog, a distance of approximately 700 to 800 km. 88/

The sources of ferroalloys, such as ferrochrome and nickel, and the quantities used at the Stalingrad Metallurgical Plant are unknown. The source and quantities of refractories are also unknown, although silica sand came by rail from the Urals. 89/ and magnesite from Zisterdorf, Austria in 1949. 90/

Crude oil, used exclusively as fuel for the open-hearth furnaces, 91/ comes from Baku in trainloads and by tankers to Stalingrad on the Volga River. 92/ The quantity of fuel oil used is not known, but it is estimated to be 26 to 29 gallons per ton of steel produced. 93/ On this basis, fuel oil consumption in 1953 amounted to 30,103,000 gallons for open-hearth furnaces alone.

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d. Coal and Coke.

Because this plant has no blast furnaces or coke production and uses fuel oil to heat the open-hearth furnaces, the use of coal is confined largely to supplying fuel for the steam boilers. Coal is obtained from the Donetz Basin 94/ and Upper Silesia. 95/

e. Ironmaking Facilities.

There are no blast furnaces. The plant possesses 1 cupola, 2 m in diameter and 8 to 10 m in height, for the production of gray cast iron. 96/ Judging from the types of castings made, the gray iron production of the cupola is used mainly for plant maintenance parts. 97/

f. Steelmaking Facilities.

Before the destruction by the Germans during World War II the plant had 15 open-hearth furnaces (2, 30-ton capacity; 6, 50-ton; and 7, 100- to 130-ton) or a total hearth area of 378.83 sq m. 98/ Rehabilitation of the open-hearth department was begun in 1943, and for the most part the furnaces were rebuilt to their prewar capacity. 99/

Hearth areas for the open-hearth furnace are estimated as follows: 30-ton capacity, 14.5 sq m; 50-ton, 24.2 sq m; and 110-ton, 14.4 sq m.

Coefficients of open-hearth furnace operation are given as 5.0 for 1948, 100/ 7.3 for 1951, 101/ 7.4 for 1952, 102/ and estimated at 7.5 for 1953.

In addition to the open-hearth furnaces, there are 5 electric furnaces, each with a capacity of 5 tons. 103/ Steel production at the Stalingrad Metallurgical Plant during 1952 is given in Table 3.\*

Similarly, using a coefficient of 7.5, the 1953 production is estimated to be 1,182,200 tons of steel by open-hearth furnaces and 25,000 tons by electric furnace, or a total steel production of 1,207,200 tons.

All open-hearth furnaces are oil fired, and, during the period 1946-48, charging practice consisted of 80 to 85 percent scrap and 15 to 20 percent cold pig iron because of readily available war damage scrap. 104/ Since a scrap shortage occurred in 1949, 105/ it is assumed that scrap charging practice has returned to normal.

g. Primary Rolling Mills.

The primary rolling facilities consist of a blooming-slabbing mill, billet mill, and heavy bar mill. 106/

\* Table 3 follows on p. 14.

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Table 3

Steel Production at the Stalingrad Metallurgical Plant  
1952

<u>Furnaces</u>		<u>Hearth Area (Square Meters)</u>	<u>Coefficient</u>	<u>Operating Days per Year</u>	<u>Production</u>
<u>Number</u>	<u>Type</u>				
2	Open-Hearth	29	7.4	325	69.7
6	Open-Hearth	145.2	7.4	325	349.2
7	Open-Hearth	310.8	7.4	325	747.5
5	Electric <u>a/</u>				25.0
					<u>1,191.4</u>

a. Industrial capacity of 5 metric tons.

The blooming-slabbing mill is a Krupp-made installation of 1,150-mm diameter and electrically driven. 107/ In 1949 this mill had a rolling rate of 230 ingots per shift. 108/ Annual capacity of the blooming mill is estimated to be approximately 900,000 to 1 million tons.

The billet and heavy bar mills are both 750-mm diameter, 3-star installations. 109/

h. Finishing Facilities.

Reconstruction did not alter the size or number of finishing installations, but the capacity was expanded by using modern, more efficient equipment. 110/ The finishing facilities of the plant are, as follows:

Light Plate Mills: 450 mm with 1 roughing stand and 5 finishing stands. Annual capacity, 100,000 tons.

Light Plate Mill: New installation with one 600-mm roughing stand and four 450-mm finishing stands. Annual capacity, 250,000 tons.

Light Plate Mill: A 3-high installation, 1 stand with roll diameters of 750/525/750 mm.

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Universal Plate Mill: One 660-mm horizontal stand and one 610-mm vertical stand.

Small Bar Mill: One 550-mm roughing stand and six 325-mm finishing stands.

Rod Mill: One 560-mm roughing stand, ten 360/390-mm intermediate stands, and four 265-mm finishing stands.

Sheet Mill: An older 3-high installation with roll diameters of 750/525/750 mm.

New Sheet Mill: Two Lauta 4-high installations with roll diameters of 970/370 mm.

Continuous Sheet Mill: Ten stands with roll diameters of 625 mm.

Wire Mill: Number and type of drawing units are unknown. 111/

Pickling Shop: Four vats for pickling of sheets. 112/

Heat Treatment Shop: Eight annealing furnaces, 10 x 25 x 1.5 m, and 9 annealing furnaces, 8 x 4 x 3 m, used for heat treatment of sheets. In addition, there are 4 oil-fired furnaces for heat treatment of bars.

Forging and Pressing Shop: Twelve steam hammers of various capacities, 7 heavy presses, and many light forging and pressing units. 113/

i. Intraplant Services.

The service facilities of the plant are comprised of the following:

Electric Power: There are two thermal power plants within the plant. One is an old boilerhouse with 3 or 4 Cornwall boilers and an isolated engine house with several steam engines directly connected with a dynamo. 114/ The other power plant was put into operation in 1947 and has 3 boilers coupled with steam turbines. Total capacity of the power plants is 24,000 kw. 115/

The Stalingrad electric power station at Belokovka also supplies current to this plant. This current is 6,000 volts and is reduced to 440 and 220 volts, as required.

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The electrical equipment installed during reconstruction was designed to operate on alternating current instead of direct current, as most equipment did before the war. 116/

Oil Distribution System: There is a system of standpipes, pumps, and tanks at the piers on the Volga River to handle oil transported by tankers. Each storage tank has its own pumping station operated by central control. Pipelines must be replaced every 8 years. 117/

Water Supply: Water is pumped from the Volga River into a filtering and purification system and then distributed through 1.5-m pipes, laid 2.4 m deep, to various parts of the plant and the nearby workers' settlement. 118/

Maintenance Department: The maintenance department has a number of machine shops scattered throughout the plant with the conventional equipment of lathes, planers, drill presses, and welding equipment, mostly German-made. 119/

Compressor Station: There are 4 air and gas compressors housed in a building 15 x 8 x 10 m.

J. Products and Production.

Steel products produced before 1932 were of commercial quality. At that time it was decided to emphasize the production of quality grades including alloy steels in order to meet the requirements of two nearby plants engaged in the manufacture of tractors, tanks, guns, and other ordnance, including shell blanks. 120/

The principal products of the plant are ingots, blooms, billets, forgings including forgings for breech blocks, gun barrels, and shells, 121/ armorplate, 122/ commercial carbon steel plate in thicknesses from 2 to 10 cm, 123/ square, hexagonal, octagonal, and round steel bars of various sizes in 6-m lengths, 124/ structurals including angles, T's, beams, and channels, 125/ rails (identified with Krasny Otkryabr and year of manufacture), 126/ carbon sheets including roofing sheets and deep-drawing quality for automobiles, 127/ stainless steel sheets of nickel-chrome and straight chrome grades, 128/ and rods and wire. 129/

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In 1941, 250,000 tons, or about one-third of the total steel production of 750,000 tons, was alloy steel production. <sup>130/</sup> In 1934, 32.1 percent of total steel production was alloy steel. <sup>131/</sup> If this same relationship existed recently, it can be concluded that the plant produced approximately 385,000 tons of alloy steels annually in 1952 and 1953. In 1934, alloy steel production was 51 percent chrome-nickel and 49 percent straight chrome grades. <sup>132/</sup> Although sizable tonnages of these two grades are still produced, other types of alloy steels have been added. Just before World War II a chrome-manganese-titanium grade, designated as "18 KHGT" steel, was developed and produced at this plant. <sup>133/</sup> Ingot and finished steel production at the Stalingrad Metallurgical Plant during selected years from 1897 to 1953 are given in Table 4.

Table 4

Ingot and Finished Steel Production at the Stalingrad Metallurgical Plant  
Selected Years, 1897-1953

Thousand Metric Tons		
Year	Ingot <sup>a</sup>	Finished Steel <sup>b</sup>
1897 <sup>134/</sup>	130.0	93.6
1930	249.3 <sup>a/</sup>	179.5 <sup>135/</sup>
1931	286.5 <sup>a/</sup>	206.3 <sup>135/</sup>
1932	306.0 <sup>a/</sup>	220.3 <sup>135/</sup>
1933	393.3 <sup>136/</sup>	277.2 <sup>137/</sup>
1934 <sup>137/</sup>	440.0	335.7
1935 <sup>137/</sup>	518.0	421.0
1936 <sup>138/</sup>	625.0	512.0
1937	718.9 <sup>136/</sup>	517.6 <sup>b/</sup>
1938	744.7 <sup>136/</sup>	536.2 <sup>b/</sup>
1941	750.0 <sup>139/</sup>	540.0 <sup>b/</sup>
1946 <sup>140/</sup>	417.0	320.0
1947	600.0 <sup>140/</sup>	432.0 <sup>b/</sup>
1948	750.0 <sup>141/</sup>	540.0 <sup>b/</sup>
1952	1,167.3 <sup>c/</sup>	530.2 <sup>b/</sup>
1953	1,182.8 <sup>c/</sup>	851.6 <sup>b/</sup>

a. Determined by dividing finished steel by 72 percent yield.

b. Finished steel derived by using a yield of 72 percent of ingot steel production.

c. CIA estimate.

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k. Distribution.

In general, the finished steel products of the Stalingrad Metallurgical Plant are consumed by the automobile plants in Moscow and Gorkiy and the tractor and other machine-building enterprises nearby. 142/

Specifically, a large portion of the production is delivered to the nearby Dzerzhinskiy Tractor Plant and to the Red Barricade Ordnance Plant, 143/ gun and shell forgings in 1941 were supplied to the Red Barricade Ordnance Plant, 144/ plates and sheets are furnished to the Astrakhan shipyards, 145/ high-grade sheets of deep-drawing quality are supplied to the Stalin Automobile Works at Moscow, 146/ plates are furnished to the tractor works at Khar'kov, 147/ ball-bearing steel is shipped to the bearing manufacturing plant in Saratov, 148/ and steel rods are sent to the metal parts plant near Stalingrad for the manufacture of screws and bolts. 149/

l. Plant Efficiency.

In recent years the Stalingrad Metallurgical Plant has introduced many steps to increase the efficiency of operations including fuel-saving measures, increased mechanization, and new technology.

Of particular importance was the installation of automatic temperature control on open-hearth furnaces. The automatic temperature control and changes in structural design of the furnaces have increased ingot productivity and added to furnace life. Before these changes the furnaces had to be repaired after 70 to 80 heats, while now they last 200 to 240 heats before repairs are necessary.

As a result of improved technology, scheduling, and mechanization, labor productivity increased 23.8 percent for ingot production and 20.9 percent for finished steel within a year. 150/

m. Administration.

The plant is under the Ministry of Metallurgical Industry. 151/

n. Personnel.

Until 1947, there were 15,000 to 18,000 employees in the plant, of whom 2,000 were German prisoners of war, 4,500 to 7,200 were women, and 1,500 were forced Russian labor. 152/ Forced labor gradually replaced the German prisoners of war, and by 1949 there were no German prisoners of war in the plant. After completion of the reconstruction, the labor force was reduced to 10,000 Russian civilians in 1952. 153/

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Some of the key personnel at this plant during the past 20 years were as follows:

P.A. Matevosyan, director of plant, 1943-45.  
Simon Hirschfield, co-director in 1950. 154/  
Col. Markulov, co-director in 1950. 155/  
Marusenko (fnu), chairman of the plant committee, 1949. 156/  
Philipson (fnu), manager of the steel works, 1948 and 1949. 157/  
G. Gaburev, chief engineer, February 1949. 158/  
Iaptshev (fnu), chief engineer, 1949-52. 159/  
Torashehenko (fnu), head of technical department, 1952. 160/

c. Locational Characteristics.

The location on the west bank of the Volga River provides low-cost transportation for raw materials, including fuel oil from Baku, for 6 months of the year. Temperature ranges from 40°C in the summer to -40°C in the winter. 161/

5. Zelenodolsk Ammunition and Agricultural Machinery Plant 184 (Sergei Ordzhonikidze 184, 162/ Zelenodolsk Metallurgical Factory, Zelenodolsk Ammunition Factory, and Molotov 184 163/) (IR No. 7009143).

a. Location.

55 50' N - 48 29' E, Zelenodolsk, Tatar ASSR. 164/ The plant is located 100 m north of the Volga River on the southwest outskirts of the town, west of the Zelenodolsk Shipyard 340, and southwest of the main railroad station. 165/

b. History and Development.

The plant was originally built in 1928 by US engineers and was enlarged during 1939-41 still according to plans drawn by US engineers. 166/

In 1943 there were reputed to be 7 electric furnaces, which produced 20,000 tons of steel for castings and forgings. 167/ In this same period other equipment included 2 Toledo presses of 1,000-ton capacity, a stamping shop with 3 Spirtz presses of 600-ton capacity and 2 of 1,000-ton capacity, a 1,000-ton press from Izhevsk, 10 to 15 presses of 35-ton capacity from Sorokovo, 20 to 30 lighter presses of different makes and sizes, and a mechanical repair shop. 168/

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Since this plant is essentially an ammunition plant specializing in the production of brass shell cases and aluminum pots, pans, and other household wares, very little pressing and stamping capacity was used for steel items.

In 1946 and 1947 the iron and steel foundries were modernized. 169/

c. Raw Materials and Other Inputs.

In 1943, when production was reported to be 20,000 tons of steel, scrap consumption amounted to 22,000 tons. 170/ Although no present information is available on the scrap consumption, pig iron is used at the rate of 30,000 tons per year. 171/ Sources of pig iron are unknown.

d. Coal and Coke.

Approximately 30 tons of coal and coke are received daily. 172/ No coke is made at the plant.

e. Ironmaking Facilities.

There are no blast furnaces for the production of pig iron, but the iron foundry has 2 cupolas of 6-ton-per-hour capacity for gray cast iron. 173/ Only 1 cupola operates each day and casts only in 1 shift. 174/ On this basis, it is estimated that 16,600 tons of gray iron are produced annually.

f. Steelmaking Facilities.

Although 7 electric furnaces with a total capacity of 20,000 tons per year were reported in 1943, 175/ these small furnaces have either been removed or diverted to the melting of brass or aluminum, because the latest reports list only 2 electric furnaces, each of 15-ton capacity, in the steel foundry. 176/ With these furnaces, steel production is estimated to have been 30,000 tons annually in 1952 and 1953.

g. Primary Rolling Mills.

None.

h. Finishing Facilities.

Although there is considerable capacity for pressing and stamping at this plant, practically all capacity is utilized in the production of brass and aluminum items. The only finishing facilities used for iron and steel

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production are the iron and steel foundries, except a small amount of forging on parts for plows, harrows, and seeding drills. 177/

i. Intraplant Services.

Electric power is supplied by the Zelenodolsk power station, and water comes from the municipal system. A maintenance machine shop services the two foundries. 178/

j. Products and Production.

The iron foundry produces cylinder blocks for 4- and 6-cylinder engines, cast iron gears, and iron frames for agricultural machines. 179/ Maximum weight of iron castings is 400 to 500 pounds, with the exception of cylinder blocks. 180/

The steel foundry produces gears, plow points, and other parts for agricultural machinery. 181/ The estimated steel and finished steel production at the Zelenodolsk Ammunition and Agricultural Machinery Plant during 1943, 1952, and 1953 are given in Table 5.

Table 5

Steel and Finished Steel Production at the Zelenodolsk  
Ammunition and Agricultural Machinery Plant  
1943, 1952, and 1953

Year	Thousand Metric Tons	
	Steel	Finished Steel <u>a/</u>
1943	20.0 <u>182/</u>	12.0
1952	30.0	18.0
1953	30.0	18.0

a. Finished steel production is estimated as 60 percent of steel output, based on the fact that all finished steel is light castings.

k. Distribution.

All iron and steel castings, with the exception of the engine cylinder blocks, are used within the manufacturing plant. There is no information about the shipment of cylinder blocks.

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l. Plant Efficiency.

Rejections of cylinder blocks have been as high as 35 percent 184/ because of inexperienced labor. 184/ In 1948 the production plan was under-fulfilled by 20 percent. This failure was attributed to a shortage of pig iron. The plant generally does not fill its production quota because over-all rejection is as high as 30 percent. 185/

Work morale was reported to be extremely low because norms once met were set higher and higher. 186/

m. Administration.

No recent information available.

n. Personnel.

In 1951 the deputy director was Rosenberg (fnu), and the superintendent of the foundry was Alexander Iatyanov. 187/

Recent reports set the number of employees in the whole plant at 5,800, of whom 2,900 are women, 100 are juveniles between the ages of 12 to 14 years, and 30 are engineers. 188/

6. Zelenodolsk Shipyard 340 189/ (Maxim Gorki Shipyard, formerly Krasny Metallist Shipyard 190/) (IR No. 7007142).

a. Location.

55°50' N - 48°30' E, 191/ Zelenodolsk, Tatar ASSR 192/ The shipyard is located 500 m southeast of the veneer factory, 3 km west of Zelenodolsk, and 1 km southwest of the single-track railroad to Kazan. 193/

b. History and Development.

The Zelenodolsk Shipyard 340 was begun in 1922 by French engineers. 194/ It suffered no damage during World War II 195/ but made little progress at that time because of the lack of equipment. 196/ Since 1945 the shipyard and auxiliary installations have been enlarged and equipped with new machinery of East German, British, and Swedish origin. 197/

In 1943 the steel foundry had 1 oil-fired open-hearth furnace of 6.5 sq m hearth area and 2 electric furnaces. The combined annual production of these furnaces was 30,000 tons of steel, all of which was consumed by the plant. 198/ Other wartime facilities included are iron foundry, boiler house, and shell department. 199/

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c. Raw Materials and Other Inputs.

In 1943, 13,000 tons of pig iron and 20,000 tons of scrap were consumed by the iron and steel foundries. 200/ By 1950, inputs amounted to 120 tons each of pig iron and scrap per day, 40 to 80 tons of limestone, 1 carload of graphite electrodes (30 cm x 1.5 m), 1 carload of round steel bars up to 8 cm in diameter x 12 m in length, 1,000 to 1,200 tons of molding sand, and 8 to 10 tons of copper plates on a weekly basis. In addition, zinc and tin ingots were received at regular intervals, and carloads of molasses came irregularly. One tank car of fuel oil was consumed weekly. 201/ Other inputs include ingots, blooms, and billets for forgings. 202/

In addition to the daily supply of pig iron, there was a stockpile of 7,000 tons, which was reserved for emergencies. 203/

d. Coal and Coke.

In 1950, coal was received at the rate of 20 tons per day, and coke at 120 tons. 204/ A reserve of 4,000 tons of coke was maintained at all times. 205/

e. Ironmaking Facilities.

The iron foundry has 2 cupolas 206/, each of 6-ton capacity. 207/ Apparently these cupolas do not operate at capacity because in 1949 there were only 1,000 to 2,000 tons of cast iron produced. 208/

f. Steelmaking Facilities.

Steelmaking facilities in the steel foundry consist of one 12-ton, oil-fired open-hearth furnace with a hearth area of 6.5 sq m 209/ and 2 electric furnaces, each with a capacity of 12 to 15 tons. 210/ Steel production at the Zelenodolsk Shipyard 340 during 1952 and 1953 is given in Table 6.\*

g. Primary Rolling Mills.

None.

h. Finishing Facilities.

In addition to the iron and steel foundries the plant possesses the following associated facilities:

\* Table 6 follows on p. 24.

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Table 6

Annual Steel Production at the Zelenodolak Shipyard 340  
1952 and 1953

Furnaces		Individual	Heats per Day	Operating Days per Year	Production
Number	Type	Capacity (Metric Tons)			(Thousand Metric Tons)
1	Open-Hearth	12	3	325	11.7
2	Electric	15			30.0
					<u>41.7</u>

Heat Treatment Shop: Four hardening furnaces, 7 x 4 x 6 m, and 6 oil-quenching tanks, 3 x 3 m. 211/

Forging Shop: Three hammers of 5-ton, 3-ton and 1-ton capacity and 4 lighter hammers. There are 3 heating furnaces, 7 x 4 m. 212/

#### i. Intraplant Services.

Electric power is supplied by the Zelenodolak municipal power station. 213/ Auxiliary services are furnished by a machine shop, welding shop, compressor plant, and boiler shop. 214/

#### j. Products and Production.

Finished production of Zelenodolak Shipyard 340 is principally subchasers, motor launches, and river craft. 215/ Before 1945 a sizable portion of the plant facilities were used in the production of shell cases, but in 1945 the entire plant was converted to a shipyard. Immediately thereafter the production of subchasers amounted to 5 ships in 1946, 7 ships in 1947, and 10 to 12 ships in 1948. 216/

The entire production of the steelmaking facilities is devoted to castings, forgings, and armorplate for ships. 217/ Production of castings is estimated as 25,000 tons in 1953.

#### k. Distribution.

There are no indications that any castings or forgings are shipped from the plant. 218/

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l. Plant Efficiency.

During the war the plant operated with poor efficiency because lack of equipment 219/, but, since the enlargement and renovation which took place in 1945, progress appears to have been made.

m. Administration.

No recent information available.

n. Personnel.

In 1950, top administration of the shipyard rested in the Headquarters of the Admiral. 220/

Earlier reports showed a wide fluctuation in the number of employees, most recent reports, however, agree that there are 1,500 employees, 25 per cent of whom are women. 221/

In 1949, monthly wages were 300 rubles for unskilled labor, 500 rubles for skilled workers, and 800 to 1,000 rubles for foremen. The workers were reported to be very dissatisfied with the low rate of pay. 222/

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APPENDIX A

PLANT SUMMARY TABLES

Table 7

Production and Capacity of the  
Ammunition and Ordnance Plant Krasnaya Barricade 221  
1953

	Thousand Metric Tons <u>a/</u>
Metallurgical Coke Production	None
Pig Iron Production	None
Steel Production	
6 Open-Hearth and 2 Electric Furnaces	255.0
Rolling and Finishing Capacity	
Primary Mills	None
Plate Mill	Unknown
Iron Foundry	75.0
Steel Foundry	140.0
Finished Steel Production	
Castings	140.0
Rolled	Unknown
Power Plant Capacity	300 Kilowatts

a. Unless otherwise indicated.

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Table 8

Production and Capacity of the  
Saratov Munitions and Metal Products Plant 614  
1953

<u>Thousand Metric Tons</u>	
Metallurgical Coke Production	None
Pig Iron Production	None
Steel Production	
4 Small Open-Hearth Furnaces	10.0
Rolling and Finishing Capacities	
Primary Mills	None
Finishing Rolling Mills	None
Iron Foundry	14.5
Steel Foundry	Unknown
Finished Steel Production	
Castings	24.0
Power Plant Capacity	None

Table 9

Production and Capacity of the  
Saratov Tractor Parts Plant Serp I Molet  
1953

<u>Thousand Metric Tons</u>	
Metallurgical Coke Production	None
Pig Iron Production	None
Steel Production	10.0
Rolling and Finishing Capacities	
Primary Rolling Mills	None

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Table 9

Production and Capacity of the  
Saratov Tractor Parts Plant Serp I Molot  
1953  
(Continued)

Thousand Metric Tons	
Rolling and Finishing Capacities (Continued)	
Finishing Rolling Mills	None
Iron Foundry	Unknown
Steel Foundry	Unknown
Finished Steel Production	
Castings	6.0
Power Plant Capacity	None

Table 10

Production and Capacity of the  
Stalingrad Metallurgical Plant  
1953

Thousand Metric Tons a/*	
Metallurgical Coke Production	None
Pig Iron Production	None
Steel Production	
15 Open-Hearth and 5 Electric Furnaces	1,207.2
(Alloy Steel)	(385.0)
Rolling and Finishing Capacities	
Blooming Mill	900 to 1,000
Bar and Billet Mill	Unknown
450-mm Light Plate Mill	100

\* Footnote to Table 10 follows on p. 30.

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Table 10

Production and Capacity of the  
Stalingrad Metallurgical Plant1953  
(Continued)

	Thousand Metric Tons
Rolling and Finishing Capacities (Continued)	
600-mm Light Plate Mill	250.0
Light Plate Mill	Unknown
Universal Plate Mill	Unknown
Small Bar Mill	Unknown
Rod Mill	Unknown
Old Sheet Mill	Unknown
New Sheet Mill	Unknown
Continuous Sheet Mill	Unknown
Wire Mill	Unknown
Forging and Pressing Department	Unknown
Finished Steel Production (Finished Alloy Steel)	369.2 (281.0)
Power Plant Capacity	300 Kilo- watts

a. Unless otherwise indicated.

Table 11

Production and Capacity of the  
Zelenodolsk Ammunition and Agricultural Machinery Plant  
1953

	Thousand Metric Tons
Metallurgical Coke Production	None.
Pig Iron Production	None
Steel Production	
2 Electric Furnaces	30.0

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Table 11

Production and Capacity of the  
Zelenodolsk Ammunition and Agricultural Machinery Plant  
1953  
(Continued)

	Thousand Metric Tons
Rolling and Finishing Capacities	
Rolling Mills	None
Iron Foundry	Unknown
Steel Foundry	Unknown
Finished Steel Production	
Castings	18.0
Power Plant Capacity	None

Table 12

Production and Capacity of the  
Zelenodolsk Shipyard 340  
1953

	Thousand Metric Tons
Metallurgical Coke Production	None
Pig Iron Production	None
Steel Production	
1 Open-Hearth and 2 Electric Furnaces	41.7
Rolling and Finishing Capacities	
Rolling Mills	None
Iron Foundry	Unknown
Steel Foundry	Unknown
Finished Steel Production	
Castings and Forgings	25.0
Power Plant Capacity	None

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APPENDIX E

METHODOLOGY

Methodology employed in this report centered principally on three types of estimates: (1) cast iron production from cupolas, (2) steel produced from open-hearth and electric furnaces, and (3) total finished steel obtained from available production of liquid steel.

In most cases the diameters of the cupolas producing cast iron were given. When the diameters were known, analogy to the US industry was applied, according to the following table:

<u>Cupola Diameter</u> <u>(Inches)</u>	<u>Iron Melted per Hour*</u> <u>(Pounds)</u>
48	14,000
60	20,000 to 25,000
72	30,000 to 40,000

Estimates of steel produced by open-hearth furnaces involved the hearth areas of the furnaces in square meters, the coefficients of production (tons of steel produced per square meter of hearth area per 24-hour period) and the number of working days per year. When all of the factors were known, annual steel production was estimated by the following equation:

$$\text{Hearth Area (tons)} \times \text{Coefficient (tons per sq m per 24 hours)} \times \text{Number of Working Days per Year} = \text{Annual Production (tons)}.$$

When hearth areas and coefficients could not be determined, annual steel production of open-hearth furnaces was derived by the following formula:

$$\text{Furnace Capacity (tons)} \times \text{Number of Heats per day} \times \text{Number of Working Days per Year (325)} = \text{Annual Production (tons)}.$$

Unless the number of heats per day and the number of working days per year were given, annual production of electric furnaces was estimated as 1,000 tons per ton of furnace capacity. This, however, should be taken as minimum annual production.

\* This factor refers to cupola operating hour. The estimates were modified where the actual operating time was reported.

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When definite information was lacking, finished steel production was derived as a yield of steel production, varying between 55 and 72 percent, depending on the type of finished steel produced.

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APPENDIX C

GAPS IN INTELLIGENCE

Coefficients of utilization of open-hearth furnaces were not available for any of the plants in Region VI with the exception of the Stalingrad Metallurgical Plant.

In some cases, recent specific data lacked information on actual hearth areas of open-hearth furnaces and daily, weekly, or annual tonnage produced by any type of furnace.

Although the inputs of metal, pig iron, and scrap were established for most of the plants, the source of pig iron represented a major gap in intelligence. Also, little information was available on coal and coke. Although Baku was established as the source of fuel oil for the plants along the Volga River, data on the consumption of this type of fuel by most plants were nonexistent.

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APPENDIX D

SOURCES AND EVALUATION OF SOURCES

1. Evaluation of Sources.

There has been a marked decrease recently in the quantity and quality of intelligence reports covering the steel plants located in Region VI of the USSR. Although there are a number of prisoner-of-war reports which are dated 1952 and 1953, all of these reports contain information of the 1946-49 period, or mid-1950 at the latest.

Since most of the plants producing steel in Region VI are shipbuilding, armament, munitions, or machine-building establishments, recent newspaper reports concerning the steelmaking facilities and status of operations are practically nonexistent.

Other sources failed to reveal any information specifically relating to the steelmaking facilities of the plants covered in this report.

a. Prisoner-of-War Reports.

Within the limitations already defined, the prisoner-of-war reports were the best source of information. Because a great many of these reports were produced by Army and Navy personnel, the information was slanted toward the design details of ships and guns and thus resulted in a paucity of steel-making data.

b. Army SDS Reports.

For the most part, the SDS reports were adjudged to be accurate. Their value was limited to providing background information, which was useful in establishing the steelmaking facilities existing in the 1941-43 period.

2. Sources.

Evaluations, following the classification entry and designated "Eval.," have the following significance:

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<u>Source of Information</u>	<u>Information</u>
A - Completely reliable	Doc. - Documentary
B - Usually reliable	1 - Confirmed by other sources
C - Fairly reliable	2 - Probably true
D - Not usually reliable	3 - Possibly true
E - Not reliable	4 - Doubtful
F - Cannot be judged	5 - Probably false
	6 - Cannot be judged

"Documentary" refers to original documents of foreign governments and organizations; copies of translations of such documents by a staff officer; or information extracted from such documents by a staff officer, all of which will carry the field evaluation "Documentary" instead of a numerical grade.

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Approved For Release 1999/09/02 : CIA-RDP79-01093A000500090001-4

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Approved For Release 1999/09/02 : CIA-RDP79-01093A000500090001-4